



**K. K. Wagh Institute of Engineering Education & Research, Nashik**  
(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:III
Class:SY	Program:B.Tech
Branch Code:ADS/COM/CSD	Pattern:2023
Name of Course:Operating Systems	Course Code:2301202
Max. Marks:60	Duration:2.30 Hrs.

**Instructions:** Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains 2 pages.
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

**Marks CO**

**Question No. 1**

- 1 Explain 2-Pass assembler with a neat diagram. (6) CO1

**Question No. 2**

- 2 Explain Priority Scheduling algorithm. Calculate the average Turnaround Time and Average Waiting Time for all processes. Draw Gantt Chart. Refer the given data with 4 processes with Burst Time (BT) and Priority. (Assume higher priority number = higher priority) (6) CO2

Process	Arrival Time (AT)	Burst Time (BT)	Priority
P1	0	6	3
P2	1	8	1
P3	2	7	2
P4	3	3	4

**Question No. 3**

- 3.a) Explain deadlock. Describe the characteristics and methods used for deadlock recovery. (6) CO3

**OR**

- 3.b) Explain Banker Algorithms in detail. Check whether P1's request (1,0,2) can be granted immediately or not. (6) CO3

Process	Allocation (A,B,C)	Max (A,B,C)
P0	0, 1, 0	7, 5, 3
P1	2, 0, 0	3, 2, 2
P2	3, 0, 2	9, 0, 2
P3	2, 1, 1	2, 2, 2
P4	0, 0, 2	4, 3, 3

3.c) Explain in detail the Dining philosopher problem of synchronization. (5) CO3

**OR**

3.d) Explain Producer consumer problem synchronization. (5) CO3

3.e) Explain the solution to the critical section problem using mutex lock. (5) CO3

**OR**

3.f) Illustrate Hardware solution for critical section problem using Compare and Swap instructions. (5) CO3

**Question No. 4**

4.a) Consider the following page reference string: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. How many page faults would occur for the following replacement algorithms, Assuming 3 memory frames are available. Solve the above example using the Least Recently Used Algorithm . Write two advantages. (6) CO4

**OR**

4.b) Define the Term: (6) CO4

1. Swapping    2. Demand Paging    3. Page Hit    4. Page Miss

4.c) Describe how First-Fit, Best-Fit algorithms allocate memory in a contiguous memory system. (5) CO4

Given partitions: 150 KB, 300 KB, 600 KB, 350 KB, 200 KB

Processes: 240 KB, 120 KB, 360 KB, 500 KB

Illustrate the allocation for each method and compare internal fragmentation in each case.

**OR**

4.d) Explain with a neat diagram how page tables are implemented in hierarchical paging. (5) CO4

4.e) Summarize how Translation Lookaside Buffer (TLB) supports paging hardware. (5) CO4

**OR**

4.f) Compare Fixed Partitioning scheme and Variable Partitioning scheme of memory partitioning. (5) CO4

**Question No. 5**

5.a) A disk has 200 cylinders, numbered 0-199. The drive is currently serving the request at cylinder 63. The queue of pending requests is 27, 129, 110, 186, 147, 41, 10, 64, 120. Starting from the current head position, what is the total distance that the disk arm moves to satisfy all the pending requests by using C-SCAN algorithm. Write any two advantages. (6) CO5

**OR**

5.b) Explain First In First Out ( FIFO) disk scheduling algorithms. Give suitable example. (6) CO5

5.c) Explain with a diagram disk mechanism showing platter, track, sector, cylinder, and head movements. (5) CO5

**OR**

5.d) Explain following Linux Shell Commands with proper syntax and suitable example (5) CO6

1. sed 2. tr 3. awk 4. ls 5. mkdir 6. cat

5.e) Explain Bash Shell scripting? Illustrate a shell program on finding reverse of a string. (5) CO6

**OR**

5.f) Explain Bash Shell scripting? Illustrate a shell program on displaying Floyd triangle. (5) CO6

**..... End of question paper.....**